

NJDEP

White Paper Recommendations and Other Potential Control Measures

Port Commerce Department Comments

White Paper: DI004 – Providing Electric Power to Ships (Cold Ironing) at the Ports

General Comments:

- The Port Authority of NY & NJ (PANYNJ) contracted with Starcrest Consulting Group, LLC (Starcrest) in 2005 to differentiate and quantify various sources of commercial marine vessel emissions, including dwelling emissions specific to vessels calling at marine terminals leased by the PANYNJ, as they relate to the 15-county New York/New Jersey Long Island Non-Attainment Area (NYNJLINA) covered under their emissions inventory. We believe that the NJDEP, along with the PANYNJ and other stakeholders who are striving to advance air quality enhancements within this 15-county NYNJLINA, can benefit from the results of Starcrest's work and should incorporate this information into the findings of the Diesel Emissions Workgroup, rather than relying solely on cited West Coast based studies, which may not reflect regional costs and maritime operations.

In December 2005, Starcrest differentiated and quantified dwelling emissions by obtaining information from the latest, most comprehensive vessel-emission database available for the NYNJLINA. That is, the dwelling emission data was “mined” from Starcrest's Commercial Marine Vessel Emissions Inventory, which had inventoried emissions from the year 2000 commercial marine vessel fleet throughout the NYNJLINA, under the auspices of the multi-agency Regional Air Team. Also as part of the December 2005 work, Starcrest compared NYNJLINA maritime emissions data against the costs of implementing abatement technologies. Two reports were produced that summarize Starcrest's work, entitled “*Ocean-Going Vessel Dwelling Emissions for Year 2000, December 2005, Starcrest Consulting Group, LLC*” and “*Analysis of Vessel Dwelling Emissions and Offset Reduction Measures, December 2005, Starcrest Consulting Group, LLC*” (December 2005 Studies).

Among other things, the December 2005 Studies found that dwelling emissions associated with Ocean Going Vessels (OGVs) docking at PANYNJ-leased marine terminals account for only 0.16% of total NYNJLINA NO_x emissions, while their PM₁₀ contribution is .01% and their PM_{2.5} contribution is also .01%. Their SO₂ contribution is 0.35%; CO contribution is .003%; and VOC is .004%.

The findings also indicate “... Cold ironing may not be a practical reduction strategy for marine terminals leased by the PANY/NJ due to the fact that it requires ... changes to existing long-term lease agreements.” (i.e. active leases can not be changed unilaterally). The findings go on to state that

“More importantly, there is currently no national and/or international regulation that would prompt the spectrum of independently owned vessel holders to invest in the considerable cost of converting their vessels to accept shore-side power. Finally, there are other emission reduction methods that could be employed throughout the harbor, such as towboat retrofits, that could achieve far greater emission reductions at much less cost”. For example, Starcrest analyzes the theoretically conservative case of retrofitting a vessel, which would call nine times per year, with cold ironing capability. For comparison, the ENVIRON report characterizes vessels that call more than six times per year as “frequent flyers” and indicates that these vessels may be suitable candidates for cold ironing. Starcrest concludes that cold ironing a vessel calling nine times per year would reduce an estimated 3.1 tons of NO_x in the first year at a cost of approximately \$2,126,000 (\$1,000,000 for shore-side infrastructure, \$1,000,000 for vessel retrofit, and \$14,000 for operating costs per call). The Starcrest report goes on to demonstrate how one could instead reduce 67.7 tons of NO_x over the same period, for approximately the same cost (\$2,303,406), by utilizing a combination of different technologies.

In light of the above, and reflective of staff experience with a multitude of maritime operations, we would like to offer the specific comments that follow, which we believe will be of benefit to all stakeholders that are striving to achieve air quality enhancements.

Specific Comments:

- Current Wording: “*This technology has been used by the military at naval bases for many decades and is also in use at a few locations worldwide*”. (page 1, paragraph 1, line 5)

Suggested Wording: “As we understand, this technology has been used by the military at naval bases for many decades. Military vessels prefer to go cold iron and rely on shore power to allow for mechanical checks, maintenance and repairs associated with maintaining battle readiness. Going cold iron also minimizes watch-standing requirements and thus allows crewmembers to spend more time with families while the vessel is in port. Although such frequent maintenance is not a requirement of civilian vessels, cold ironing is also in use at a few locations worldwide”.

- Current Wording: “*Cold Ironing has now been implemented for container ships at the China Shipping facilities in Los Angeles as well as Princess Cruise Lines in Juneau, Alaska*”. (page 1, paragraph 1, line 8)

Suggested Wording: “As a result of a court mandated settlement, cold ironing or alternate maritime power (AMP) infrastructure has now been installed at the China Shipping facilities in Los Angeles to accommodate container ships that China Shipping has modified to receive it. More recently, the ports of Long Beach and Los Angeles introduced the San Pedro Bay Ports Clean Air Action Plan. The Plan, which was created with the cooperation and participation of the staff of the South Coast Air

Quality Management District, California Air Resources Board and U.S. Environmental Protection Agency, was released in draft on June 28, 2006 for public review and comments. The Plan proposes hundreds of millions of dollars in investments by the ports, the local air district, the state, and port-related industry and includes, among various measures, that all major container cargo and cruise ship terminals at the ports be equipped with shore-side electricity within five to ten years so that vessels at berth can shut down their diesel-powered auxiliary engines.

In addition to China Shipping in the Port of Los Angeles, cold ironing is also available at Princess Cruise Lines in Juneau, Alaska and Seattle, Washington.”

- Current Wording: “*The International Convention for the Prevention of Pollution Of Ships does address emission controls for hotelling ships*”. (page 1, paragraph 2, line 3)

Suggested Wording: “The International Convention for the Prevention of Pollution From Ships, Annex VI “Regulations for the Prevention of Air Pollution From Ships” introduces tighter, more stringent specifications for new and rebuilt marine diesel engines, as well as lower-sulfur content fuels, thereby reducing emissions during hotelling, as well as transit operations”.

- Current Wording: “*Cold ironing could result in significant reductions in emissions of both NOx and PM 2.5 at the ports. If funding were available to offset the cost of installation, cold ironing might be implemented voluntarily by one or more shippers and could have long-term financial rewards.* ”. (page 1, paragraph 3, line 1)

Suggested Wording:

“Cold ironing could result in significant reductions in emissions of both NOx and PM 2.5 at the ports. If funding were available to offset the cost of installation, cold ironing might be implemented voluntarily by one or more shipping lines at their facilities and this could have long-term environmental benefits. However, this might not be the most cost effective method of achieving these kinds of environmental benefits”. For example, the Starcrest report found that “... there are other emission reduction methods that could be employed throughout the harbor, such as towboat retrofits, that could achieve far greater emission reductions at much less cost”.

- Current Wording: “*Much of the information in this paper is derived from a recent report by ENVIRON International on Behalf of the Port of Long Beach, California*”. (page 1, paragraph 4, line 1)

Proposed Wording: “Information in this paper is derived from a recent report by ENVIRON International on behalf of the Port of Long Beach, California. This paper also incorporates work recently conducted by Starcrest Consulting Group, LLC, on behalf of the Port Authority of New York and New Jersey, that is specific to the NYNJLINA, entitled “*Ocean-Going Vessel Dwelling Emissions for Year 2000*,

December 2005, Starcrest Consulting Group, LLC” and “Analysis of Vessel Dwelling Emissions and Offset Reduction Measures, December 2005, Starcrest Consulting Group, LLC” (December 2005 Studies).”

- Current Wording: *“The ENVIRON Report concludes that cold ironing is ‘generally cost-effective with vessels that spend a lot of time at the port, and therefore have high annual power consumption while docked at a port’ “. (page 1, paragraph 4, line 5)*

Proposed Wording: “The ENVIRON Report concludes that cold ironing is ‘generally cost-effective with vessels that spend a lot of time at the port, and therefore have high annual power consumption while docked at a port’. However, in evaluating regional maritime conditions, the Starcrest report found that “Cold ironing may not be a practical reduction strategy for marine terminals leased by the PANY/NJ due to the fact that ... there are other emission reduction methods that could be employed throughout the harbor, such as towboat retrofits, that could achieve far greater emission reductions at much less cost”. Executive Summary, page ES-1, paragraph2, “Analysis of Vessel Dwelling Emissions and Offset Reduction Measures”, Starcrest Consulting Group, LLC, prepared for the Port Authority of New York and New Jersey, December, 2005.”

- Current Wording: *“In Long Beach, as at the Ports of Newark and Elizabeth, the dominant vessel type is container vessels. Half of the vessels that used Long Beach called only once and less than 10 percent called more than six times in a one year period. These “frequent flyers” who called more than six times in a one year period did account for more than 40 percent of all vessel calls, indicating that these vessels may be suitable candidates for cold ironing.” (page 2, paragraph 1, line 1)*

Suggested Wording: Add the following: However, the Starcrest report found that “Cold ironing may not be a practical reduction strategy for marine terminals leased by the PANY/NJ due to the fact that ... there are other emission reduction methods that could be employed throughout the harbor, such as towboat retrofits, that could achieve far greater emission reductions at much less cost”.

- Comment: Wording below is a suggested addition to page 2, adding a new paragraph 4 within current paragraph order.

Suggested Wording: For example, according to the Starcrest studies, cold ironing a vessel that calls at the Port of NY/NJ nine times a year would cost approximately \$2,126,000 in the first year (\$1,000,000 for shore-side infrastructure, \$1,000,000 for vessel retrofit, and \$14,000 for operating costs per call).

- Current Wording: *“There is some data available to assess the effectiveness of cold ironing. The ENVIRON report states that the most recent emission inventory for the combined Ports of Long Beach and Los Angeles show NOx emissions of 33.0 tons per day, with one third of this total of 11.0 tons per day coming from auxiliary engines*

operating in hotelling mode. A similar percent of diesel particulates come from hotelling and could potentially be significantly reduced through the use of cold ironing. (add NJ data)” (page 2, current paragraph 4, EFFECTIVENESS)

- Suggested Wording: “There is some data available to assess the effectiveness of cold ironing. The ENVIRON report states that the most recent emission inventory at the time of publication (Arcadis, 1999) for the combined Ports of Long Beach and Los Angeles indicated that 33.0 tons per day (tpd) of NO_x was emitted from Ocean Going Vessels (OGVs) approaching and within the ports, with one third of this total (11.0 tons per day) coming from auxiliary engines of OGVs operating in hotelling mode. ENVIRON also states that “The situation with respect to diesel particulates is similar”.

Data specific to the Port of NY/NJ found in Starcrest’s December 2005 Studies shows daily emissions of NO_x from *all* Commercial Marine Vessels (CMVs), which includes all Ocean Going Vessels (i.e. those-type vessels measured by ENVIRON) plus all Harbor Craft, such as tugs and ferries within the NYNJLINA, total 33.2 tons per day, of which the portion attributable to *all* hotelling emissions (including those at non-Port Authority facilities) equals 5.1 tons, or 15.4 %. For diesel particulates, total hotelling emissions equate to 11.7%.

Further, the December 2005 Starcrest Studies found that dwelling emissions associated with Ocean Going Vessels (OGVs) docking throughout the Port of NY & NJ account for only .39% (1,862 tpy/473,677tpy) of total NYNJLINA NO_x emissions, while their PM₁₀ contribution is .01% (56tpy/392,916tpy) and their PM_{2.5} contribution is .04% tpy (51tpy/144,915tpy). Their SO₂ contribution is 0.84% 2,234tpy/ 263,236tpy; CO contribution is .01% (279tpy/3,265,051tpy); and VOC is .01% (48tpy/531,178tpy). Dwelling emissions associated with OGVs docking specifically at PANYNJ-leased marine terminals, which is a subset of total docking emissions throughout the Port of NY & NJ, account for only 0.16% of total NYNJLINA NO_x emissions, while their PM₁₀ contribution is .01% and PM_{2.5} contribution is .01%. Their SO₂ contribution is 0.35%; CO contribution is .003%; and VOC is .004%.”

- Current Wording: *The ENVIRON report concludes that cold ironing is “generally cost-effective with vessels that spend a lot of time at the port, and therefore have high annual power consumption” (page 3, paragraph 1, line 1).*

Suggested Wording: Add the following: However, according to the Starcrest report, each call would cost the shipping lines an estimated additional \$14,000 due to cold ironing. Starcrest estimated these additional costs based on the following: “The POLA NNI (No Net Increase) cost estimates for cold ironing (that) are based on funding agreements between POLA and participating shipping lines, POLA records on the differential cost between the electricity used during cold ironing and the diesel fuel that would have been used if not for the shore-side electrical power, and on the

cost of shore-side labor needed to attach and detach the electrical connections.” As such, this would not appear to be a cost effective solution, and the higher the power consumption, the higher the additional cost per call.

- Comment: Wording below is a suggested addition to page 3, adding a new paragraph 3 within the current paragraph order.

Suggested Wording: However, Starcrest found that “Cold ironing may not be a practical reduction strategy ... due to the fact that ... there are other emission reduction methods that could be employed throughout the harbor, such as towboat retrofits, that could achieve far greater emission reductions at much less cost”. For example, Starcrest analyzed the conservative case of retrofitting a vessel, which would call nine times per year, with cold ironing capability. Cold ironing this vessel would reduce an estimated 3.1 tons of NOx at a cost of approximately \$2,126,000 in the first year (\$1,000,000 for shore-side infrastructure, \$1,000,000 for vessel retrofit, and \$14,000 for operating costs per call). The example goes on to demonstrate how one could instead reduce 67.7 tons of NOx over the same period, for approximately the same cost (\$2,303,406), by utilizing a combination of different technologies.

Putting the above example in more simple terms, cold ironing will reduce approximately 3 tons of NOx per year at a cost of roughly \$66,000 per ton. Conversely, investing the same dollar amount of potential funding into a combination of alternative emission-reduction technologies could reap a public benefit by reducing approximately 68 tons of NOx at a cost of roughly \$5,000 per ton.

- Comment: None. Wording below is a suggested addition to page3, adding Starcrest Studies to the **SOURCES** section

Suggested Wording:

3. “Ocean-Going Vessel Dwelling Emissions for Year 2000”, Starcrest Consulting Group, LLC, prepared for the Port Authority of New York and New Jersey, December, 2005.
4. “Analysis of Vessel Dwelling Emissions and Offset Reduction Measures”, Starcrest Consulting Group, LLC, prepared for the Port Authority of New York and New Jersey, December, 2005.

White Paper: DI009 – Early Retirement Program for Heavy Duty Diesel Vehicles

General Comment

- The Port Authority of NY & NJ (PANY/NJ) is a landlord port, leasing seaport facilities to private marine terminals operators (there are also marine facilities located within the Port of NY/NJ that are not associated with the PANY/NJ). Privately owned and operated drayage trucks call at the marine terminals, making drop offs or pick ups while en-route to various destinations, under contract to either the shipping line or the consignees who are the recipients of the goods), which are both served by the private marine terminal operators. Studies of the current and planned capacity of the regional transportation network undertaken as part of the multi-agency Comprehensive Port Improvement Plan (CPIP) indicate that port-related truck trips accounted for .07% of all vehicle trips and 1.8% of all truck trips in the region in 2000. CPIP projects that port-related truck trips will increase to .09% of all vehicle trips and 2.4% of all truck trips by 2020, and .12% and 3.5% respectively by 2060. (Note: CPIP was sponsored by the NJDOT/Office of Maritime Resources, Empire State Development Corporation, NY City Economic Development Corporation and the Port Authority of New York and New Jersey. Federal participants included US EPA Region II, US Army Corps of Engineers NY District, and the Federal Highways Administration. The North Jersey Transportation Planning Authority and New York Metropolitan Planning Council also contributed to the transportation network capacity study.) Clearly, a program to promote an early retirement program for heavy-duty diesel vehicles – the topic of this white paper – requires a regional, collaborative effort because the aging truck fleet is a regional issue.

Although the age and condition of these independently owned and operated drayage trucks are out of the control of the marine terminal operators, the latter have undertaken several investments to improve facility infrastructure that moves the drayage trucks through more quickly and efficiently. Such initiatives resulting in “turn time” improvements include automated gates, terminal reconfiguration, chassis pools and extended gate hours. Terminal operators appear to be doing the “right thing”, for those factors that are under their control. Accordingly, we offer the specific comments that follow.

Specific Comments

Current Wording: *“In addition, a vehicle retirement program targeted at heavy-emitting diesel vehicles at the Ports of Newark, Elizabeth or Camden might be an effective tool to achieving emission reductions in the heavily industrialized area around these Ports, particularly if the Port operators can encourage participation in a vehicle retirement program. Port operators have identified drayage (short haul) vehicles as good candidates for a vehicle retirement program because they are typically old and are independently owned and operated.”*(page 1, paragraph 1, line 9)

Suggested Wording: “In addition, a vehicle retirement program targeted at heavy-emitting diesel vehicles that visit the marine terminals at Newark, Elizabeth or Camden might be an effective tool to achieving emission reductions in the heavily

industrialized areas surrounding these seaports, particularly if a regional collaborative can be established to fund and encourage private drayage operators to participate in a vehicle retirement program. Terminal operators have identified drayage (short haul) vehicles as good candidates for a retirement program because these are typically old, heavy emitters and are owned by small, independent operators who lack the resources to modernize their vehicles.”